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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* RICHARD R. DICKSON and RUSSELL R. GRAZE, JR.

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Appeal 2007-3442  
Application 09/905,698  
Technology Center 2800

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Decided: March 6, 2008

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Before JOSEPH F. RUGGIERO, ANITA PELLMAN GROSS,  
and KEVIN F. TURNER, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 2, and 9-13. We have jurisdiction under 35 U.S.C. § 6(b).

STATEMENT OF CASE

Appellants disclose a system for measuring particulate matter in an exhaust gas stream of an internal combustion engine. (Specification [01]). The system includes a transient dilution airflow control arrangement that has variable and constant mass flow streams connected in parallel. (Specification [19] and [20]).

Claims 1-13 are pending in the application, where claims 1, 2, and 9-13 have been rejected over prior art and claims 3-8 have been indicated as containing allowable subject matter.

Independent claim 1, which is deemed to be representative, reads as follows:

1. A transient dilution air control arrangement for controlling a dilution air supply to an inlet of a partial flow dilution tunnel of a gas sampling system, the partial flow dilution tunnel being connected to an exhaust gas stream of an internal combustion engine, the gas sampling system having a first mass flow controller operatively connected to an inlet of the transient dilution air control arrangement, a second mass flow controller connected to an outlet end of the partial flow dilution tunnel and a filter interposed the second mass flow controller and the outlet end of the partial flow dilution tunnel, said transient dilution air control arrangement comprising:

a constant mass flow stream;

a variable mass flow stream; and

wherein said variable mass flow stream is connected with said constant mass flow stream prior to the inlet of the partial flow dilution tunnel.

The Examiner relies on the following prior art references to show unpatentability:

Kaufman	US 3,699,814	Oct. 24, 1972
Kono	US 4,067,300	Jan. 10, 1978
Hendren	US 2003/0136177 A1	Jul. 24, 2003

The Examiner rejected, under 35 U.S.C. § 103(a),  
claims 1 and 9 as unpatentable over Hendren,  
claim 2 as unpatentable over Hendren and Kaufman, and

claims 10-13 as unpatentable over Hendren and Kono.

While Appellants have indicated the appeal of the rejections of claims 1, 2, and 9-13, arguments have only been directed against the rejection of independent claim 1, where the patentability of claims 2 and 9-13 is argued solely based on the dependence of those claims on claim 1. We take claim 1 to be representative of the argued claims. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Brief and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Brief have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

We reverse.

## ISSUES

1) Have Appellants shown that the Examiner erred in finding claim 1 obvious over Hendren?

## FINDINGS OF FACT

1. The application details a transient dilution air control arrangement for controlling a dilution air supply to an inlet of a partial flow dilution tunnel of a gas sampling system. The partial flow dilution tunnel is connected to an exhaust gas stream of an internal combustion engine and the gas sampling system has a first mass flow controller operatively connected to an inlet of the transient dilution air control arrangement. A second mass flow controller is connected to an outlet end of the partial flow dilution

tunnel, with a filter interposed between the second mass flow controller and the outlet end of the partial flow dilution tunnel. The arrangement includes a constant mass flow stream and a variable mass flow stream, where the variable and constant mass flow streams are connected prior to the inlet of the partial flow dilution tunnel. (Specification [14]-[16]; [19]-[20] and [25]-[26]; Figs. 1-3, elements 38, 40, 44, 68, 70, 110, 112, and 114).

2. Hendren discloses a self-contained sampling system for measuring engine exhaust emissions, including a mini-dilution tunnel. The mini-dilution tunnel combines vehicle exhaust with ambient air at a constant flow rate. The dilution air provided to the tunnel is controlled through a proportional solenoid valve connected to a fixed flow rate pump which draws in ambient air to be transferred through to the tunnel. The dilution air volume flow rate is controlled by the proportional solenoid valve that is connected to the system control computer and updated every second. The diluted exhaust is measured through probes that draw gasses from the mini-dilution tunnel through mass flow controllers and pumps. (Abstract; Paragraphs [0010] and [0047]-[0049]; Fig. 2, elements 17, 20, 28, 29, 34, 36, 42, 50, 70, 72, 74, 80, 82, and 84).

3. The rejection of claims 1 and 9 stipulates that a constant mass flow stream exits from the fixed rate pump, in Hendren, and connects to a variable flow stream derived via a variably controlled solenoid valve, both before the inlet of the mini-dilution tunnel. (Answer 3-4).

4. Kaufman discloses an apparatus for sampling gaseous exhaust emissions on a constant flow basis. The system includes a venturi that acts

to meter the flow of the gaseous mixture and maintains a constant flow rate. (Abstract; col. 6, ll. 36-47).

5. Kono is directed to a rotary piston engine. The reference details the measurement of pressure fluctuations at a peripheral intake port of the engine. (Abstract, col. 4, ll. 46-58).

#### PRINCIPLES OF LAW

The Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). If that burden is met, then the burden shifts to the Appellants to overcome the *prima facie* case with argument and/or evidence. *See Id.*

The Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The analysis need not seek out precise teachings directed to the specific subject matter of the claim but can take into account the inferences and the creative steps that a person of ordinary skill in the art would employ. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007).

When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. *In re Zletz*, 893 F.2d 319, 321-22 (Fed. Cir. 1989). The definiteness inquiry focuses on whether those skilled in the art would understand the scope of the claim when the claim is read in light of the rest of the specification. *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed. Cir. 1986).

## ANALYSIS

Appellants argue that Hendren teaches that a single stream of dilution air is created by the fixed flow rate pump, with the quantity of dilution air supplied to the mini-diffusion tunnel being controlled by the proportional solenoid valve, and that no variable mass flow stream is disclosed. (Br. 4-5). The Examiner's response is to find that Appellants' interpretation is "clearly contradictory to the teaching by Hendren" and is merely speculation without evidentiary support. (Answer 7). However, we do not find Appellants' discussion to be contrary to the disclosure of Hendren. Hendren makes clear that the dilution air volume flow rate is controlled by the proportional solenoid valve, but that is not the same as the creation of a variable mass flow stream. While it is evident that the solenoid valve changes the flow rate, we find no teaching or suggestion in Hendren that a variable mass flow stream is created through the solenoid valve.

Additionally, as discussed in Appellants' Specification and in Hendren, (Findings of Fact 1 and 2), the function of a mass flow controller is to provide a constant mass flow of the constituent gases. The rejection of claim 1 envisions that the proportional solenoid valve is replaced by a mass flow controller "as it performs the function of controlling the flow rate of the flow." (Answer 4). Thus, it would seem that the replacement mass flow controller would also not provide a variable mass flow stream, as recited in claim 1. While it is true that a mass flow controller is clearly programmable and settable, that does not mean that a mass flow controller would routinely create a variable mass flow stream. We find that the Examiner has not

shown that all of the elements of claim 1 have been taught or suggested by Hendren.

In addition, according to the recitations in claim 1, the gas sampling system has a first mass flow controller which is not part of the transient dilution air control arrangement. The rejection makes clear that the Examiner interprets the system controller and the laminar flow element, disclosed in Hendren, to constitute the transient dilution air control arrangement, which also has to include the flows from the pump and the proportional solenoid valve to be consistent with the claim language. Under the Examiner's reading of claim 1 onto Hendren, the proportional solenoid valve would be both a part of the transient dilution air control arrangement, i.e. supplying the variable mass flow stream, and external to the transient dilution air control arrangement, where the rejection suggests that the proportional solenoid valve could have been replaced by a mass flow controller. As such, the rejection of claim 1 posits that a replacement for the proportional solenoid value would satisfy both claim elements, when it is clear it cannot. For this additional reason, we find the rejection of claim 1 as being obvious over Hendren to have been made in error.

We further note that nothing in the disclosures of Kaufman and Kono cures this deficiency in the rejection of claim 1. As such, we find clear error in the rejections of claims 1, 2, and 9-13.

#### CONCLUSION OF LAW

We find that the Examiner erred in rejecting claims 1, 2, and 9-13 under 35 U.S.C. § 103 based on Hendren, Kaufman and Kono.

Appeal 2007-3442  
Application 09/905,698

DECISION

The rejections of claims 1, 2, and 9-13 are reversed.

REVERSED

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